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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/660,926	09/13/2000	Nobuaki Tokushige	900-348	7467

23117 7590 07/23/2003

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EXAMINER

HU, SHOUXIANG

ART UNIT PAPER NUMBER

2811

DATE MAILED: 07/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Applicant(s)

09/660,926

Applicant(s)

TOKUSHIGE, NOBUAKI

Examiner

Shouxiang Hu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 12 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1,4-11 and 24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4-11 and 24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 May 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Drawings***

1. The corrected or substitute drawings were received on May 12, 2003. These drawings are approved.

### ***Claim Objections***

2. Claims 1, 4-11 and 24, insofar as being supported by elected Species I along with Species II, are objected to because of the following informalities and/or defects:

In claim 1, the limitation of "said contact portions" lacks sufficient antecedent basis in the claim. In claim 7, it fails to clarify the relationship between "a contact portion" and "contact portions". Accordingly, all of the terms regarding the contact portion(s) should be recited as first and second contact portions.

In claims 1 and 7, the terms of "for both" should read as: --respectively for--.

In claims 1, 7, and 24, the terms of "completely depleted" should read as: --substantially completely depleted--, because if the active regions are really completely depleted there should have no leakage current therethrough, but the original disclosure does not fully support that the off-current in the standby mode can be fully eliminated, rather than that it can be "set low" (see page 28, lines 5-8, and page 30, lines 19-24).

In claim 11, the term of "different bias voltages" should read as: --different values of said bias voltages--.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4-5, 7-9 and 11, as being best understood in view of the claim objections above, are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitani et al. ("Mitani"; WO99/27585; also see US 6,392,277 for its English version) in view of 96-12470 (" '470 "; Korean Patent Publication, of record).

Mitani discloses a semiconductor device (see Figs. 8, 16 and 17 in its English version—US 6,392,277), comprising: a first MOS transistor (Q<sub>n</sub>, n-type) with source and drain regions (28) in a semiconductor layer formed on a semiconductor substrate (20A; p-type); buried insulating film (20B); and a first contact portion (a left portion of 33D) for applying a first bias voltage to a P-type well (24A), and a second contact portion for applying a second bias voltage to an N-type well (24B) in the substrate underlying a second MOS transistor (Q<sub>p</sub>, p-type). It is noted that the active regions of the first and second transistors in Mitani can be inherently substantially completely depleted simultaneously in the standby state, as both of them are of a complete depletion type (see col. 9, lines 31-34) and the leak currents in them are further reduced in the standby state (see col. 15, lines 41-52).

Although Mitani does not expressly disclose that the contact portion can be formed in a device isolation region that isolates it from the semiconductor layer, one of

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ordinary skill in the art would readily recognize that a contact portion can be readily formed in a device isolation region which isolates it from the semiconductor layer for forming the contact with improved device isolation without wasting additional spaces, as evidenced in '470 (see the contact portion 31 formed in the device isolation region 16 which isolates it from the semiconductor layer (including 14) in Fig. (D)).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the contact-in-isolation-region structure of '470 into the semiconductor device of Mitani, so that a semiconductor device with improved device isolation without wasting additional spaces would be obtained.

Regarding claim 11, the bias voltages in Mitani inherently change the threshold voltages of the first and second transistors (see col. 14, lines 62-66).

4. Claims 6, 10 and 24, as being best understood in view of the claim objections above, are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitani et al. ("Mitani"; WO99/27585; also see US 6,392,277 for its English version) in view of 96-12470 (" '470 "; Korean Patent Publication, of record) and/or Burr (US 6,072,217)

The disclosures of Mitani and/or '470 are discussed as applied to claims 1, 4-5, 7-9 and 11 above.

Mitani further discloses that the P-type well and the N-type well are held in a reverse-bias relationship, which inherently implies that the two wells are substantially electrically isolated from each other because of the inherent electrical isolation associated with the p-n junction inherently formed therebetween.

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Although Mitani (or, Mitani and '470) does not expressly disclose that the two well can be further isolated, one of ordinary skill in the art would readily recognize that two neighboring wells can be physically spaced apart for better isolation between them, as evidenced in the Burr (see the back gate wells 544 and 546 in Fig. 5).

It would therefore have been obvious to one of ordinary skill in the art at the time the invention was made to make the semiconductor device taught by Mitani (as regarding to claim 24; or, collectively taught by Mitani and '740, as regarding to claims 6 and 10) with the two wells being further isolated, as taught in Burr, so that a semiconductor device with better inter-well isolation would be obtained.

### ***Response to Arguments***

5. Applicant's arguments filed on 5/12/03 have been fully considered but they are not persuasive.

Applicant's main arguments include: the applied prior art references do not teach or suggest the claimed invention, because: (A) Mitani fails to disclose or suggest that the contact portion is isolated from the semiconductor layer; and (B) Mitani fails to disclose or suggest that two transistors are both completely depleted simultaneously in the standby state.

With respect to applicant's Argument A above, the Examiner has recognized the shortcomings of the individual reference of Mitani, but what applicant argues is not shown in Mitani is clearly taught by the other in the combined teachings. Thus, applicant's relevant arguments about it are arguments against the references

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individually, but clearly these are not proper arguments where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In the obviousness rejection, Mitani is cited by the Examiner as teaching to form a semiconductor device that is same as the claimed invention except that the contact portion to the back gate is not formed in a isolation region that isolates it from the semiconductor layer. Reference '470 is relied on for showing what was art-known that a MOSFET with its back-gate contact being isolated from the semiconductor layer can still be workable; that back-gate contact can be desirably and readily formed in a device isolation region, as the device isolation region provides improved isolation not only between the contact and the semiconductor layer, but also between the neighboring MOSFETS; and that such a contact-in isolation structure can help to substantially save spaces in the device. Accordingly, all of the elements in the claimed invention are clearly present in the collective teachings of Mitani and '470. And, it would have been well within the ordinary skill in the art at the time the invention was made to incorporate the contact-in-isolation-region structure of '470 into the semiconductor device of Mitani for obtaining a semiconductor device with improved device isolation without wasting additional spaces therein.

Regarding Argument B above, as explained in the claim objections set forth above in this office action, the recited term of "completely depleted" in the standby state is not fully supported by the original disclosure, which shows that the off-current in the standby mode can only be "set low" (see page 28, lines 5-8, and page 30, lines 19-24),

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instead of being fully eliminated. And, the active regions of the first and second transistors in Mitani can be inherently substantially completely depleted simultaneously in the standby state, as both of them are of a complete depletion type (see col. 9, lines 31-34) and the leak currents in them are further reduced in the standby state (see col. 15, lines 41-52).

### ***Conclusion***

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shouxiang Hu whose telephone number is (703) 306-5729. The examiner can normally be reached on Monday through Thursday, 7:30 AM to 6:00 PM.




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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

SH  
July 16, 2003



Shouxiang Hu  
Patent Examiner  
TC2800